

Application Serial No. 10/066,361
Reply to Office Action of December 24, 2003

Patent
Docket No. CU-2826

Amendments To The Claims
(In The Revised Format)

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

- 1 (currently amended) A replenishing device intended to be used in a closed circuit comprising:
- a pump,
 - at least one hydraulic motor; and
 - at least two main pipes which are connected to the pump and which constitute respectively a feed main pipe and a discharge main pipe for the motor; the replenishing device comprising a replenishing selector suitable for putting the main pipe that is at the lower pressure in communication with a communication valve which itself communicates with an atmospheric pressure reservoir, the replenishing selector and the communication valve being united in the same replenishing valve unit having inlet means suitable for being connected to the main pipe that is at the lower pressure, and an outlet which communicates continuously with the atmospheric pressure reservoir, the communication valve being suitable for causing said inlet means to communicate with said outlet when the pressure in said main pipe that is at the lower pressure reaches a given pressure threshold, and the communication valve and the replenishing selector having respective mobile elements located one in the other and movable one with respect to the other.

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2 (Original) A device according to claim 1, wherein the replenishing valve unit further has a constriction suitable for being interposed between the inlet means and the outlet of said valve unit, when said inlet means and said outlet are connected together via the communication valve.

3 (previously presented) A closed circuit according to claim 17, wherein the outlet of the replenishing valve unit is connected to the atmospheric pressure reservoir via the internal space of the motor.

4 (previously presented) A closed circuit according to claim 17, wherein the replenishing valve unit further has a constriction suitable for being interposed between the inlet means and the outlet of said valve unit, when said inlet means and said outlet are connected together via the communication valve, and wherein the outlet of the replenishing valve unit is connected to the atmospheric pressure reservoir via the internal space of the motor.

5 (previously presented) A device according to claim 1, wherein the replenishing valve unit comprises a valve body and a replenishing slide, the valve body having two inlet ports respectively connected continuously to respective ones of the two main pipes and an outlet port that communicates with the atmospheric pressure reservoir, the replenishing slide being mounted to slide in the valve body by being controlled by the fluid pressure at said inlet ports acting

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against return means for returning the slide, so that said slide is caused to move between a neutral position in which said slide isolates the inlet and outlet ports, and two replenishing positions, in which that one of the first and second inlet ports which is connected to the main pipe at the lower pressure is capable of communicating with the outlet port via said inlet means and communication means, said replenishing valve unit further having the communication valve acting, when the slide is in the replenishing positions, to close off said communication means so long as the fluid pressure at the inlet port that is connected to the main pipe at the lower pressure has not reached a given pressure threshold.

6 (Original) A device according to claim 5, wherein first and second control chambers communicating continuously respectively with the first and the second inlet ports of the valve body are provided at respective ends of the replenishing slide, and wherein, as considered in a direction in which the slide is displaced, the valve body successively presents the first inlet port, the outlet port, and the second inlet port.

7 (Original) A device according to claim 5, wherein first and second control chambers communicating continuously respectively with the first and the second inlet port of the valve body are provided at respective ends of the replenishing slide, wherein, as considered in a direction in which the slide is displaced, the valve body successively presents the first inlet port, the second

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inlet port and the outlet port, and wherein the first control chamber is situated at the end of the replenishing slide that is closer to the first inlet port, while the second control chamber is situated at the opposite end and communicates with the second inlet port via a control channel provided in the valve body.

8 (previously presented) A closed circuit according to claim 17, wherein the outlet of the replenishing valve unit is connected to the atmospheric pressure reservoir via the internal space of the motor, wherein the casing of the motor is provided with a recess in which two main ducts connected to respective ones of the two main pipes and a removal duct connected to the internal space of said casing open out, wherein the valve body forms a part suitable for being put in place in said recess such that the two inlet ports and the outlet port of said valve communicate respectively with the two main ducts, and with the removal duct, and wherein the device includes sealing means suitable for co-operating with the valve body and with said recess in the casing to prevent any communication between said main ducts and the removal duct inside said recess otherwise than via the inlet and the outlet ports of the valve body.

9. (Original) A device according to claim 5, wherein the slide co-operates with a piston mounted to move relative to the slide between a neutral position in which said piston closes off said communication means and at least one communication position in which said piston opens said communication means, said piston being suitable for being controlled to move between said positions

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thereof by control means comprising a piston control chamber which, when the slide is in a replenishing position, is connected to the main pipe at the lower pressure.

10. (currently amended) A closed circuit according to claim 8, wherein the replenishing valve unit comprises a slide that co-operates with a piston mounted to move relative to the slide between a neutral position in which said piston closes off said communication ~~means~~ valve and at least one communication position in which said piston opens said communication ~~means~~ valve, said piston being suitable for being controlled to move between said positions thereof by control means comprising a piston control chamber which, when the slide is in a replenishing position, is connected to the main pipe at the lower pressure.

11. (previously presented) A device according to claim 1, wherein the communication valve has a first pressure threshold as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to the first main pipe and a second pressure threshold different from the first pressure threshold, and as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to said second main pipe.

12. (previously presented) A device according to claim 9, wherein the

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communication valve has a first pressure threshold as from which said communication valve causing the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to the first main pipe and a second pressure threshold different from the first pressure threshold, and as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to said second main pipe, wherein the piston is suitable for occupying first and second communication positions, into which said piston is caused to go respectively by feeding a first piston control chamber with fluid against first piston return means and by feeding a second piston control chamber with fluid against second piston return means, and wherein said first and second piston return means are calibrated for different pressures.

13. (previously presented) A closed circuit according to claim 10, wherein the communication valve has a first pressure threshold as from which said communication valve causing the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to the first main pipe and a second pressure threshold different from the first pressure threshold, and as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to said second main pipe, wherein the piston is suitable for occupying first and second communication positions, into which said piston is caused to go respectively by feeding a first piston control chamber with fluid against first

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piston return means and by feeding a second piston control chamber with fluid against second piston return means, and wherein said first and second piston return means are calibrated for different pressures.

14. (previously presented) A device according to claim 5, wherein the communication means comprise a calibrated passageway.

15. (previously presented) A device according to claim 1, wherein the replenishing valve unit has a first constriction suitable for being interposed between the inlet means and the outlet of the valve unit when said inlet means is connected to the first main pipe, and a second constriction suitable for being interposed between the inlet means and the outlet of the valve unit when said inlet means is connected to the second main pipe.

16. (previously presented) A device according to claim 5, wherein the communication means comprise a first calibrated passageway suitable for causing the first inlet port to communicate with the outlet port, and a second calibrated passageway suitable for causing the second inlet port to communicate with the outlet port.

17. (currently amended) A closed circuit comprising:

a pump;

at least one hydraulic motor having a casing which defines an

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internal space and in which a cylinder block is disposed; and

at least two main pipes which are connected to the pump and which constitute respectively a feed main pipe and a discharge main pipe for the motor; and
a replenishing device comprising a replenishing selector suitable for putting the main pipe that is at the lower pressure in communication with a communication valve which itself communicates with an atmospheric pressure reservoir, the replenishing selector and the communication valve being united in the same replenishing valve unit having an inlet means suitable for being connected to the main pipe that is at the lower pressure, and an outlet which communicates continuously with the atmospheric pressure reservoir via the internal space of the motor, the communication valve being suitable for causing said inlet means to communicate with said outlet when the pressure in said main pipe that is at the lower pressure reaches a given pressure threshold, wherein the casing of the motor is provided with a recess in which two main ducts connected to respective ones of the two main pipes and a removal duct connected to the internal space of said casing open out and wherein the replenishing valve unit has a valve body that presents two inlet ports and an outlet port and that forms a part suitable for being placed in said recess such that the two inlet ports and the outlet port communicate respectively with the two main ducts and with the removal duct.

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18. (previously presented) A closed circuit according to claim 17, wherein the replenishing valve unit further has a constriction suitable for being interposed between the inlet means and the outlet of said valve unit, when said inlet means and said outlet are connected together via the communication valve.

19. (previously presented) A closed circuit according to claim 17, wherein the replenishing valve unit comprises a valve body and a replenishing slide, the valve body having two inlet ports respectively connected continuously to respective ones of the two main pipes and an outlet port that communicates with the atmospheric pressure reservoir, the replenishing slide being mounted to slide in the valve body by being controlled by the fluid pressure at said inlet ports acting against return means for returning the slide, so that said slide is caused to move between a neutral position in which said slide isolates the inlet and outlet ports, and two replenishing positions, in which that one of the first and second inlet ports which is connected to the main pipe at the lower pressure is capable of communicating with the outlet port via communication means, said replenishing valve unit further having the communication valve acting, when the slide is in the replenishing positions, to close off said communication means so long as the fluid pressure at the inlet port that is connected to the main pipe at the lower pressure has not reached a given pressure threshold.

20. (previously presented) A closed circuit according to claim 19, wherein first and second control chambers communicating continuously respectively with

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the first and the second inlet ports of the valve body are provided at respective ends of the replenishing slide, and wherein, as considered in a direction in which the slide is displaced, the valve body successively presents the first inlet port, the outlet port, and the second inlet port.

21. (previously presented) A closed circuit according to claim 19, wherein first and second control chambers communicating continuously respectively with the first and the second inlet port of the valve body are provided at respective ends of the replenishing slide, wherein, as considered in a direction in which the slide is displaced, the valve body successively presents the first inlet port, the second inlet port and the outlet port, and wherein the first control chamber is situated at the end of the replenishing slide that is closer to the first inlet port, while the second control chamber is situated at the opposite end and communicates with the second inlet port via a control channel provided in the valve body.

22. (previously presented) A closed circuit according to claim 19, wherein the slide co-operates with a piston mounted to move relative to the slide between a neutral position in which said piston closes off said communication means and at least one communication position in which said piston opens said communication means, said piston being suitable for being controlled to move between said positions thereof by control means comprising a piston control chamber which, when the slide is in a replenishing position, is connected to the

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main pipe at the lower pressure.

23. (previously presented) A closed circuit according to claim 17, wherein the communication valve has a first pressure threshold as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to the first main pipe and a second pressure threshold different from the first pressure threshold, and as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to said second main pipe.

24. (previously presented) A closed circuit according to claim 22, wherein the communication valve has a first pressure threshold as from which said communication valve causing the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to the first main pipe and a second pressure threshold different from the first pressure threshold, and as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to said second main pipe, wherein the piston is suitable for occupying first and second communication positions, into which said piston is caused to go respectively by feeding a first piston control chamber with fluid against first piston return means and by feeding a second piston control chamber with fluid

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against second piston return means, and wherein said first and second piston return means are calibrated for different pressures.

25. (previously presented) A closed circuit according to claim 10, wherein the communication valve has a first pressure threshold as from which said communication valve causing the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to the first main pipe and a second pressure threshold different from the first pressure threshold, and as from which said communication valve causes the inlet means and the outlet of the replenishing valve unit to communicate when said inlet means is connected to said second main pipe, wherein the piston is suitable for occupying first and second communication positions, into which said piston is caused to go respectively by feeding a first piston control chamber with fluid against first piston return means and by feeding a second piston control chamber with fluid against second piston return means, and wherein said first and second piston return means are calibrated for different pressures.

26. (previously presented) A closed circuit according to claim 19, wherein the communication means comprise a calibrated passageway.

27. (previously presented) A closed circuit according to claim 17, wherein the replenishing valve unit has a first constriction suitable for being interposed between the inlet means and the outlet of the valve unit when said inlet means

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is connected to the first main pipe, and a second constriction suitable for being interposed between the inlet means and the outlet of the valve unit when said inlet means is connected to the second main pipe.

28. (previously presented) A closed circuit according to claim 19, wherein the communication means comprise a first calibrated passageway suitable for causing the first inlet port to communicate with the outlet port, and a second calibrated passageway suitable for causing the second inlet port to communicate with the outlet port.

29. (previously presented) A replenishing device intended to be used in a closed circuit comprising:

- a pump,
- at least one hydraulic motor; and
- at least two main pipes which are connected to the pump and which constitute respectively a feed main pipe and a discharge main pipe for the motor; the replenishing device comprising a replenishing selector suitable for putting the main pipe that is at the lower pressure in communication with a communication valve which itself communicates with an atmospheric pressure reservoir, the replenishing selector and the communication valve being united in the same replenishing valve unit having an inlet means suitable for being connected to the main pipe that is at the lower pressure, and an outlet which communicates continuously

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with the atmospheric pressure reservoir, the communication valve being suitable for causing said inlet to communicate with said outlet when the pressure in said main pipe that is at the lower pressure reaches a given pressure threshold, the replenishing valve unit comprising a valve body and a replenishing slide, the valve body having two inlet ports respectively intended to be connected to the respective ones of the two main pipes and an outlet port intended to communicate with the atmospheric pressure reservoir, the replenishing slide being mounted to slide in the valve body by being controlled by a fluid pressure at said inlet ports between a neutral position and two replenishing positions, first and second control chambers communicating continuously with said first and second inlet ports being provided at respective ends of the replenishing slide, wherein, as considered in a direction in which the slide is displaced, the valve body successively presents the first inlet port, the second inlet port and the outlet port and wherein the first control chamber is situated at the end of the replenishing slide that is closer to the first inlet port, while the second control chamber is situated at the opposite end and communicates with the second Inlet port via a control channel provided in the valve body.